Document Title:	Function Group:	Information Type:	Date:
Steering, description	**600**	**Service Information**	**2014/12/11**
Profile: **GRD, G990 [GB]**			

Steering, description

The G900 series machine is equipped with a load sense steering system. The steering system is powered by the main steering and implement pump. Priority is given to the steering hydraulic circuit by way of a priority flow valve. For a more comprehensive description of the priority flow valve, refer to 912 Priority flow valve - description and operation. A pressure relief valve within the steering priority flow valve, limits the maximum steering pressure to 10 MPa (103 bar, 1500 psi). Two steering cylinders are used on all G900 series machines.

Steering control unit

The steering control unit is mounted directly in front of the steering wheel and is activated by means of a driveshaft. The steering control unit is a non reaction type valve with a closed center. The steering control unit has a dynamic load sensing connection which drains to the hydraulic oil tank when the steering spool is in the neutral position. Whenever the spool is moved out of the neutral position, the load sense line is directed to the flow compensator of the main implement and steering pump.

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Service Information

Document Title:	Function Group:	Information Type:	Date:
Steering system, function check	**600**	**Service Information**	**2014/12/11**
Profile: **GRD, G990 [GB]**			

Steering system, function check

Op nbr 600-001

11666051 Pressure gauge

1. After repair work has been completed in any steering system related hydraulic circuit, a steering system function check must be performed as described below:

    1. Install the pressure gauge at test ports P1 (main pressure) and P3 (steering pressure).
    2. Start the machine.
    3. Without any functions activated, check that the pressure at the test ports is correct:
       P1: 2.4 MPa (24 bar, 350 psi) (stand-by pressure)
       P3: 1.8 MPa (18 bar, 260 psi)
    4. Steer to the right. Check the response from the steering system. The function should be smooth all the way until the steering cylinders bottom out.
    5. When the cylinders bottom out read the pressure setting at test port P3. The pressure should be 11 MPa (110 bar, 1600 psi).
    6. Repeat steps 4 and 5 only steering to the left.
    7. Using the wheel lean function increase the main hydraulic pressure to the maximum and check that the reading at test port P1 is 22.4 MPa (224 bar, 3250 psi). Check the steering system pressure at test port P3 while having the main pressure up. Steering pressure should cut off at the correct level (11 MPa, 110 bar, 1600 psi) independent of the main system pressure.
    8. Remove the pressure gauge.

    NOTE!
    If the machine is equipped with a secondary steering system then test the system functionality as described in Secondary steering system, function check. Refer to 647 Secondary steering function, checking.

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Service Information

Document Title: **Steering axle, description and operation**	Function Group: **620**	Information Type: **Service Information**	Date: **2014/12/11**
Profile: **GRD, G990 [GB]**			

Steering axle, description and operation

The front axle of the machine performs two primary functions. These functions are steering axle pivot and wheel lean. It must also be capable of carrying heavy front mounted attachments.

Tandem drive and AWD (All Wheel Drive) front axles share a group of common parts. What differentiates the two axles is the "wheel group" that attaches to the knuckle. A tandem drive machine uses a spindle to mount a wheel hub. An AWD machine uses a cradle to mount a hydraulic motor.

Steering

Two hydraulic cylinders pivot the spindles or cradles on king pins in the knuckle. Self lubricating bearings support the king pins in the knuckle frame. A seal is installed at the top and bottom of each bearing. Thrust loads are transferred between the knuckle and the spindle by a special thrust bearing. Each of the four king pins are retained in the spindle by hexagon screws. The drag link ensures that both sides turn simultaneously.

Pivoting axle

The pivot of the front axle allows the wheels to travel over uneven ground with minimal main frame movement. The axle frame mounts onto a pivot pin supported in the main frame with two self lubricating bearings. The pivot pin with retainer is secured to the axle frame by means of a spacer, washer and bolt. This locks the pivot pin to the axle frame. The pin pivots on the bearings installed in the main frame.
Thrust bearings are installed on the pivot pin between the axle frame and the main frame to transmit the thrust load. A seal is installed on the outside of the main frame pivot bearings. Pivot stops restrict axle oscillation to 16° on each side of the machine's center line.

Wheel lean

Leaning the wheels reduces the turning radius, braces against moldboard imposed side loads and gives better stability when grading on a slope. Bearings and seals are installed in the knuckle which supports the pivot pin. The pivot pin with retainer is secured to the axle frame by means of a spacer, washer and bolt. Thrust loads are transferred through thrust bearings mounted on the pivot pin between the knuckle and axle frame. Models G930 to G960 uses the standard duty axle and has one wheel lean cylinder. Models G970 to G990 uses the heavy duty axle and has two wheel lean cylinders. The crossbar keeps both wheels parallel so that they lean together.

Wheel hub - tandem drive wheel group

Two tapered roller bearings support the wheel hub. The spindle lock nut tightness determines preload. A sealing ring along with a lip seal prevents bearing cavity pressurization and dirt ingress.

Wheel - AWD (All Wheel Drive) group

A hydraulic motor is mounted directly onto the AWD hub. The hub mounts into the knuckle the same way as the tandem driven machines. A hose guard on the hub protects the hydraulic hoses.

Toe-in

The term "toe-in" refers to the distance between the front toe of the tires is less than the distance between the rear of the tires. On tandem drive models, toe-in is 3 - 6.5 mm (1/8 - 1/4 in.). On AWD machines, there is no toe-in, as the front wheels are also driving wheels. Toe-in is altered by adjusting the drag link length.

Document Title:	Function Group:	Information Type:	Date:
Steering axle, components	**620**	**Service Information**	**2014/12/11**
Profile: **GRD, G990 [GB]**			

Steering axle, components

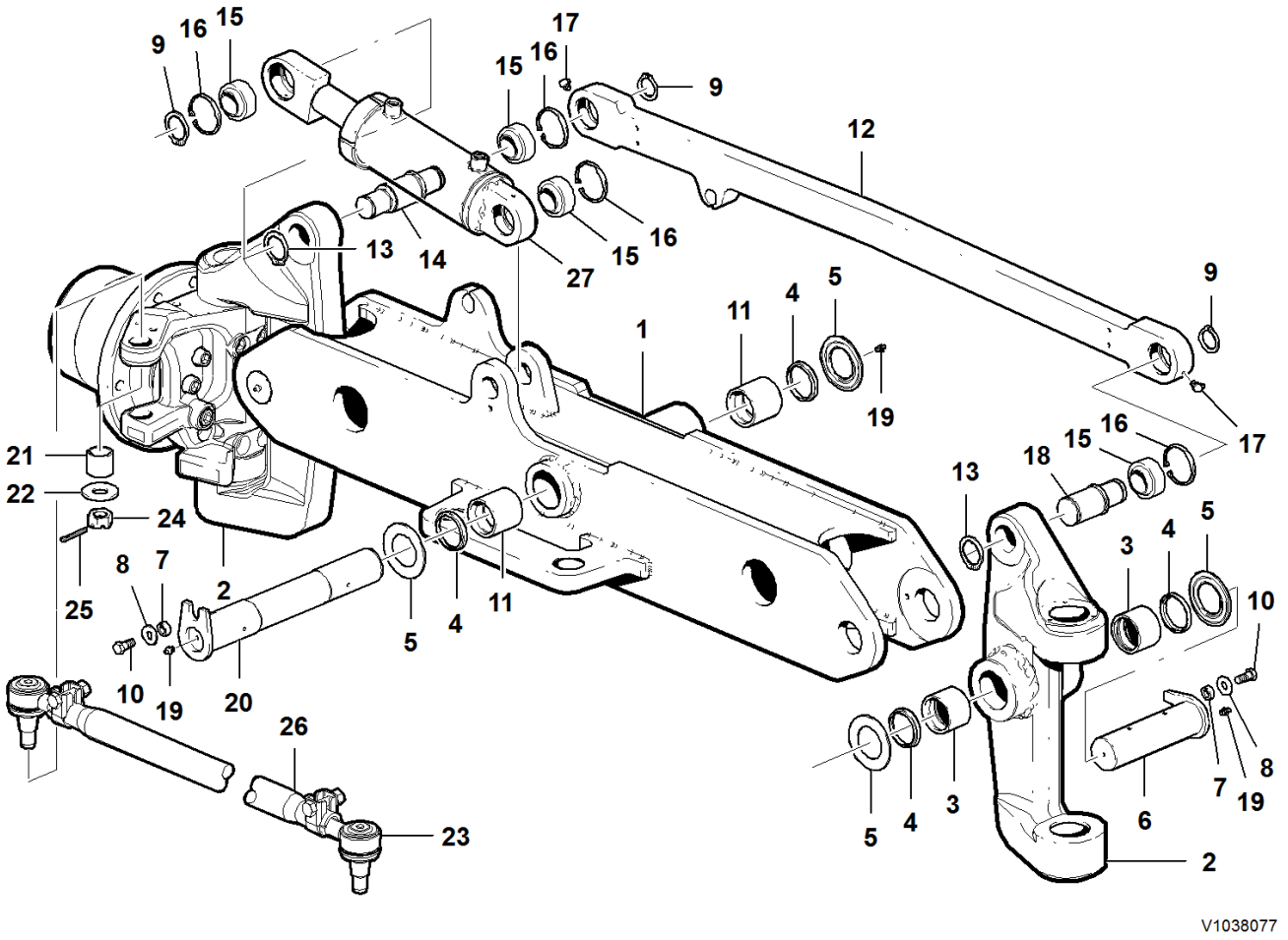

Figure 1
Front axle assembly — G930, G940 and G960

1. Frame
2. Steering knuckle
3. Bearing
4. Seal
5. Thrust washer
6. Pivot pin
7. Spacer
8. Washer
9. Retaining ring
10. Hexagon screw
11. Bearing
12. Tie bar
13. Retaining ring
14. Pin
15. Spherical bearing

16. Retaining ring
17. Lubricating nipple
18. Pin
19. Lubricating nipple
20. Pivot pin
21. Bushing
22. Washer
23. Tie rod end
24. Castle nut
25. Cotter pin
26. Drag link
27. Wheel lean hydraulic cylinder

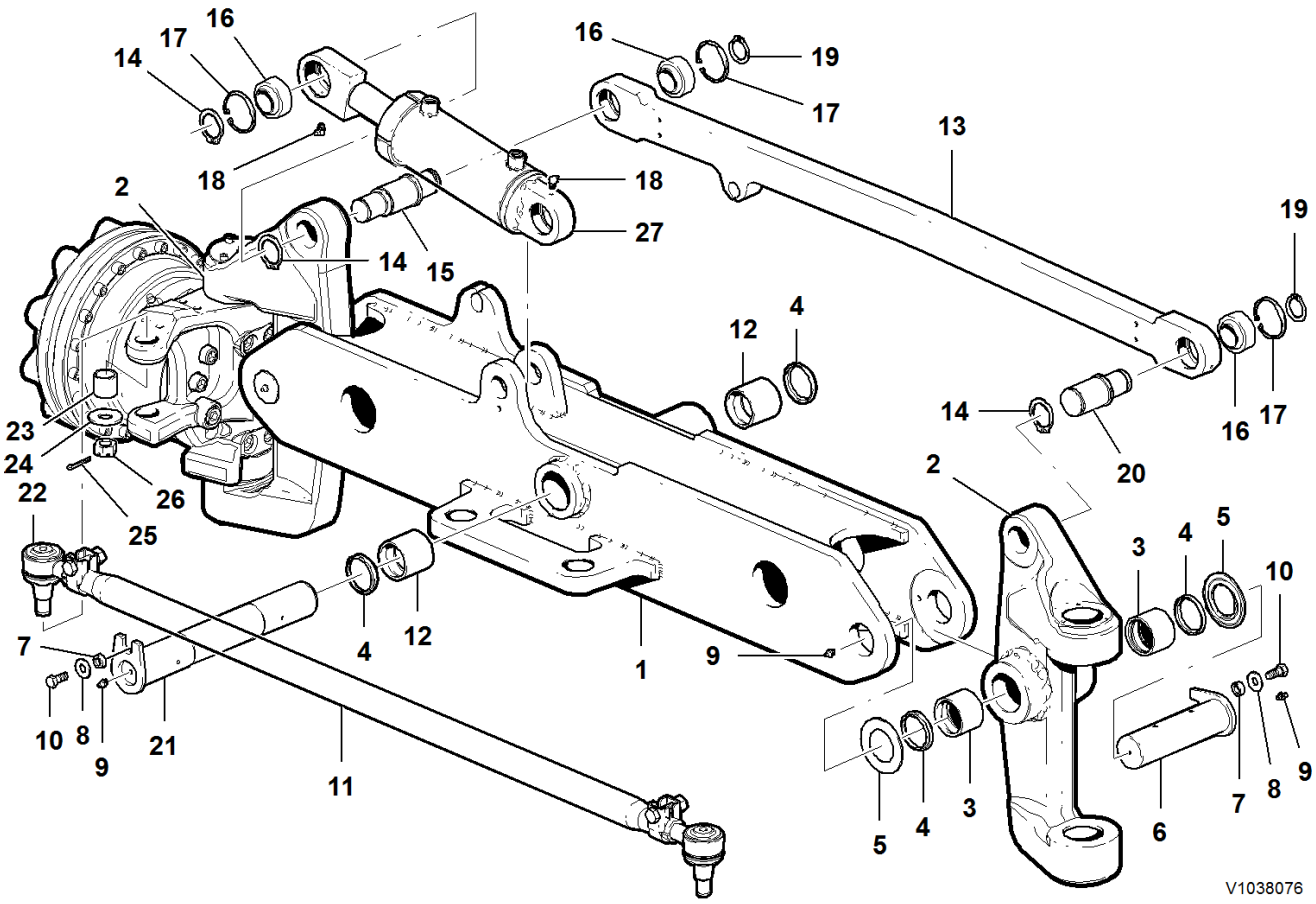

Figure 2
AWD (All Wheel Drive) front axle assembly — G946 and G976

1. Frame
2. Steering knuckle
3. Bearing
4. Seal
5. Thrust washer
6. Pivot pin
7. Spacer
8. Washer
9. Lubricating nipple
10. Hexagon screw
11. Drag link
12. Bearing
13. Tie bar
14. Retaining ring
15. Pin

16. Spherical bearing
17. Retaining ring
18. Lubricating nipple
19. Retaining ring
20. Pin
21. Pivot pin
22. Tie rod end
23. Bushing
24. Washer
25. Cotter pin
26. Castle nut
27. Wheel lean hydraulic cylinder

Document Title: **Wheel Hub - Removal**	Function Group: **622**	Information Type: **Service Information**	Date: **2014/12/11**
Profile: **GRD, G990 [GB]**			

Wheel Hub - Removal

Op nbr 622-052

1. Place the machine in the 191 Service position.

2. **WARNING**
   Only use lifting devices with adequate capacity.

   Attach a safe lifting device to the wheel hub. Remove the hub cap and O-ring.

3. Bend back the tabs of the lock washer. Remove the outer lock nut, lock washer and inner lock nut. Remove the wheel bearing washer.

4. Pull the wheel hub out slightly on the spindle and remove the outer bearing cone. Remove the wheel hub from the spindle.

5. Remove the inner bearing cone. Remove and discard the seal.

6. Inspect the bearing cups for signs of damage or wear. If necessary, use a hammer and soft metal drift to remove them. If replacing the bearing cups, place them in a freezer to shrink them for easier installation.

Document Title:	Function Group:	Information Type:	Date:
Wheel Hub - Installation	**622**	**Service Information**	**2014/12/11**
Profile: **GRD, G990 [GB]**			

Wheel Hub - Installation

Op nbr 622-069

1. Use a hammer and soft metal drift to install the inner and outer bearing cups into the wheel hub. Alternatively, place the cups into a freezer to shrink them for easier assembly.

2. Pack the inner bearing cone with grease. Mate the bearing cone with the cup and using a hammer and soft metal drift, install the seal into the wheel hub.

3. Install the seal ring onto the axle. Lubricate the seal on the wheel hub.

4. Attach a safe lifting device to the wheel hub. Slide the wheel hub onto the spindle.

5. Pack the outer bearing cone with grease and install it on the axle. Install the wheel bearing washer and the inner lock nut.
   NOTE!
   Always install the inner and outer lock nuts with the chamfer facing outwards from the wheel hub.

   NOTE!
   Do not over lubricate the wheel bearing cones. Excess grease can damage the hub cap O-ring.

6. Set the wheel bearing preload. Refer to 622 Front axle wheel bearing preload, checking and adjusting.

7. Place the machine back in service.

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Service Information

Document Title: **Front wheel bearing, repacking**	Function Group: **622**	Information Type: **Service Information**	Date: **2014/12/11**
Profile: **GRD, G990 [GB]**			

Front wheel bearing, repacking

Op nbr 622-087

The front wheel bearings should be repacked with grease every 1500 hours.

Wheel bearing removal

1. Place the machine in the 191 Service position.
2. Remove the front wheel. Refer to 771 Wheel, removing and fitting one.
3. Remove the four socket head screws from the hub cap. Remove the hub cap from the hub assembly.
4. Clean out any excess grease and debris. Remove the outer lock nut.
5. Remove the tab washer.
6. Remove the inner lock nut, washer and outer wheel bearing.
7. **WARNING**
   Only use lifting devices with adequate capacity.

   Attach a safe lifting device to the hub and gently remove the hub from the spindle.
   NOTE!
   The inner bearing and seal will stay with the hub.
8. Place the hub in position to allow the use of a punch to enter the cap side of the hub. Carefully drive out the inner seal and bearing together.
9. Thoroughly clean and inspect all components. Replace any damaged parts, if necessary.

Wheel bearing re-installing

10. Completely repack the wheel bearings with the recommended grease.
11. Re-install the inner bearing into the wheel hub. Apply grease into the hub cavity.
    NOTE!
    A total amount of 0.5 kg of grease should be used per wheel hub assembly. This includes applying grease to the wheel hub cap.
12. Install a new inner seal.
13. Install a new seal onto the spindle.
14. Attach a safe lifting device to the hub and position it back onto the spindle.
15. Slide the repacked outer bearing up the spindle and into position.

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